Why **Real** Exchange Rates?

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HOW does one determine whether a currency is fundamentally undervalued or overvalued? This question lies at the core of international economics, many trade disputes, and the new IMF surveillance effort.

George Soros had the answer once—in 1992—when he successfully bet $1 billion against the pound sterling, in what turned out to be the beginning of a new era in large-scale currency speculation. Under assault by Soros and other speculators, who believed that the pound was overvalued, the British currency crashed, in turn forcing the United Kingdom's dramatic exit from the European Exchange Rate Mechanism (ERM), the precursor to the common European currency, the euro, to which it never returned.

But in the ensuing years, neither Soros nor fellow speculators have repeated the feat consistently, and the economics profession itself lacks a foolproof method of establishing when a currency is properly valued. This failure is striking given that the exchange rate is a central price in economics and that there is a measure potentially capable of delivering the answer and for which plenty of data exist: *the real exchange rate* (RER).

What things really cost

Most people are familiar with the *nominal exchange rate*, the price of one currency in terms of another. It's usually expressed as the domestic price of the foreign currency. So if it costs a U.S. dollar holder $1.36 to buy one euro, from a euro holder's perspective the nominal rate is 0.735. But the nominal exchange rate isn't the whole story. The person, or firm, who buys another currency is interested in what can be bought with it. Are they better off with dollars or euros? That's where the RER comes in. It seeks to measure the value of a country's goods against those of another country, a group of countries, or the rest of the world, at the prevailing nominal exchange rate.

One can measure the real exchange rate between two countries in terms of a single representative good—say, the Big Mac, the McDonald's sandwich of which a virtually identical version is sold in many countries. If the real exchange rate is

1, the burger would cost the same in the United States as in, say, Germany, when the price is expressed in a common currency. That would be the case if the Big Mac costs $1.36 in the United States and 1 euro in Germany. In this one-product world (in which the prices equal the exchange rates), the purchasing power parity (PPP) of the dollar and the euro is the same and the RER is 1 (see box). In this case, economists say that absolute PPP holds.

But suppose the burger sells for 1.2 euros in Germany. That would mean it costs 20 percent more in the euro area, suggesting that the euro is 20 percent overvalued relative to the dollar. If the real exchange rate is out of whack, as it is when the cost is 1.2, there will be pressure on the nominal exchange rate to adjust, because the same good can be purchased more cheaply in one country than in the other. It would make economic sense to buy dollars, use them to buy Big Macs in the United States at the equivalent of 1 euro, and sell them in Germany for 1.2 euros. Taking advantage of such price differentials is called arbitrage. As arbitrageurs buy dollars to purchase Big Macs to sell in Germany, demand for dollars will rise, as will its nominal exchange rate, until the price in Germany and the United States is the same—the RER returns to 1.

In the real world, there are many costs that get in the way of a straight price comparison—such as transportation costs and trade barriers. But the fundamental notion is that when RERs diverge, the currencies face pressure to change. For overvalued currencies, the pressure is to depreciate; for undervalued currencies, to appreciate. It can get more complicated if factors such as government policies hinder normal equilibration of exchange rates, often an issue in trade disputes.

Overvalued or undervalued?

How about comparing purchasing power when countries sell more than one product? To do this, economists usually measure the real exchange rate in terms of a broad basket of goods. Because the price of such a basket normally takes the form of an index number—such as the consumer price index (CPI), which includes both goods and services—the RER is also typically expressed as an index that can be bench-

marked to any chosen time period. Going back to the dollar-euro example, if an RER index is 1.2, the average consumer prices in Europe are 20 percent higher than in the United States, relative to the chosen benchmark. Indexes don't measure absolute prices (such as the price of the Big Mac), but changes in overall prices relative to a base year (if, say, the index is 100 in the year 2000 and 120 in 2007, average prices are 20 percent higher than in 2000). In this case, if RER indexes between countries don't change over time, we say that relative PPP holds.

RER indexes between two countries can be important. The massive U.S. trade deficit with China has become a political and economic issue, and whether its roots are in a fundamentally misaligned exchange rate is a point of contention.

But, for the most part, economists and policymakers are more interested in the *real effective exchange rate* (REER) when measuring a currency's overall alignment. The REER is an average of the bilateral RERs between the country and each of its trading partners, weighted by the respective trade shares of each partner. Being an average, a country's REER may be in "equilibrium" (display no overall misalignment) when its currency is overvalued relative to that of one or more trading partners so long as it is undervalued relative to others.

To establish when a currency is misvalued, and, if so, by how much, a rough assessment can be obtained by the REER series over time. Under either absolute or relative PPP, there should be no change in REERs over time if currencies are in equilibrium. But because consumption patterns can change faster than the market baskets statisticians construct—as can trade policies and tariffs and transportation costs—deviations in REERs don't necessarily indicate fundamental misalignment.

Yet, even though transportation costs and tariffs have declined sharply over the past century and national consumption baskets have grown more uniform, fluctuations of REERs have intensified. A century ago, among advanced economies, REER fluctuations were within a 30 percent band. In the 1980s,

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the United States experienced swings in its REER as wide as 80 percent! Other countries have had similar experiences.

Tough calls

But not all large REER fluctuations should be interpreted as indications of misalignment. Some large REER adjustments are remarkably smooth, suggesting that there may be factors besides transportation costs, tastes, and tariffs that play a key role in moving about the REER of a currency that is not misaligned.

Technological progress leading to productivity increases in goods commonly traded, called tradables, is thought to be one of those factors. Higher productivity lowers production costs, thus lowering prices of such tradable goods in the higher-productivity country, which then translates into lower tradable goods prices elsewhere through international competition. But not all goods are tradables. Nontradable sectors, such as housing and many personal services, face minimal international price competition. So the prices of tradable goods will tend to fall relative to those of nontradable goods. To the extent that nontradable goods have a large weight in the country's consumption basket, the country's consumer price index will rise relative to the international consumer basket; hence, its REER will tend to appreciate. This mechanism is often referred to as the "Balassa-Samuelson effect." Both theory and data support that much of the REER variations across countries are accounted for by fluctuations in the prices of nontradables relative to those of tradables, and particularly so among developing countries.

Persistent changes in terms of trade (such as oil producers usually experience) and differences in fiscal policies, tariffs, and even financial development can also help explain why REERs can differ across countries. The IMF and economic analysts take such real exchange rate fundamentals into account in estimating the "*equilibrium*" *REER*, around which the actual REER should hover if there is no misalignment.

Estimating equilibrium REERs can be difficult because prices are somewhat sticky in the short run and the nominal exchange rate is not (at least in countries where exchange rates are market determined). So REERs typically display considerable short-run volatility in response to news and noise trading, and it's not surprising that many market participants and policymakers get things wrong—sometimes very wrong. That can lead to massive realignments with devastating consequences—such as the 1992 ERM crisis. Imperfect though they may be, REERs have signaled large exchange rate overvaluations in the run-up to many financial crises, making it important for the IMF and others to monitor bilateral RERs and multilateral REERs. ∎

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What is the real exchange rate?

The RER between two currencies is the product of the nominal exchange rate (the dollar cost of a euro, for example) and the ratio of prices between the two countries. The core equation is RER=eP^*/P, where, in our example, e is the nominal dollar-euro exchange rate, P^* is the average price of a good in the euro area, and P is the average price of the good in the United States.

In the Big Mac example, $e = 1.36$. If the German price is 2.5 euros and the U.S. price is $3.40, then (1.36) x (2.5) ÷ 3.40 yields an RER of 1. But if the German price were 3 euros and the U.S. price $3.40, then the RER would be 1.36 x 3 ÷ 3.40 = 1.2.